Fact Sheet

Air Force Space Command

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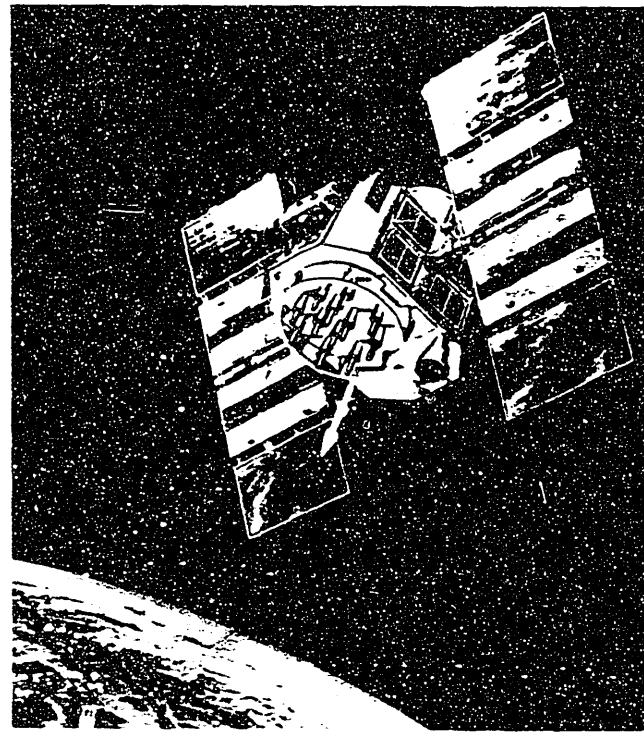
Navstar Global Positioning System

The Navstar Global Positioning System is a space-based radio navigation network operated and controlled by the 2nd Satellite Control Squadron, a unit of the 2nd Space Wing, at Falcon AFB, Colo.

Navstar, when fully operational, will provide 24-hour navigation information to meet the needs of the U.S. military services worldwide. These services include:

- Extremely accurate three-dimensional positioning, velocity and precise time.
- A worldwide common grid that is easily converted to any local grid.
- Passive all-weather operations.
- Continuous real-time information.
- Support to an unlimited number of users and areas.
- Support to civilian users at a slightly less-accurate level.



The Navstar Global Positioning System will significantly enhance many of the functions being provided today by current positioning and navigational equipment and will result in greater accuracies at lower cost. Such things as en route navigation by mapping, aerial rendezvous and refueling, geodetic surveys, range instrumentation and safety, and search and rescue operations will be available. This system provides military users with highly accurate three-dimensional (longitude, latitude and altitude) position, velocity and time information.

The Navstar satellites circle the globe every 12 hours, emitting continuous navigation signals. With proper equipment, users can receive the signals and determine their location within tens of feet, velocity within a fraction of a mile per hour and time within a millionth of a second.

To obtain this information, the user's set will automatically select the four most favorable satellites, lock onto their navigation signals and compute the position, velocity and time.

User sets have been developed for use by individuals, aircraft, land vehicles and ships. Operational test and evaluation of airborne, ground, and sea user sets have been under way for the past several months at the U.S. Army's Yuma Proving Ground at Yuma, Ariz., and many other worldwide locations.

User sets will be single channel, two channel or five channel, and will be composed of an antenna, antenna electronics, receiver and control/display unit.

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In 1989, the Navstar Global Positioning System constellation consisted of 11 satellites, six Block I (Research and Development) and five Block II (Operational) satellites. This constellation provides users with three to nine hours of navigation coverage worldwide.

The space segment, when fully operational in early 1993, will consist of 21 Block II satellites plus three on-orbit spares. The constellation will consist of six orbital planes with four satellites in each plane.

The Delta II expendable launch vehicle is used to launch the Navstar satellites from Cape Canaveral Air Force Station, Fla., into 11,000 mile circular orbits. GPS satellites transmit on two different L-band frequencies. Launch weight is nearly 2,000 pounds. The operational satellites will have a design life of seven and one-half years.

The Navstar Master Control Station, operated by the 2nd Satellite Control Squadron, will be responsible for monitoring and controlling the 21 satellite constellation. The GPS Control Segment consists of five monitor stations and four ground antennas located around the world. The monitor stations use a GPS receiver to passively track all satellite signals. The information from the monitor stations is then processed at the Master Control Station to estimate satellite ephemeris and clock states, and to update the navigation message of each satellite.

This updated information is transmitted to the satellite by way of antennas using an S-band data signal. The ground antennas are also used for transmitting and receiving satellite telemetry and control information. Through these links, the satellites' computers will be updated so users will receive optimum mission performance.

The Air Force Systems Command's Space Systems Division at Los Angeles Air Force Base, Calif., acts as executive agency for the Department of Defense in acquiring and managing the developmental Navstar program. Air Force Space Command personnel operate the GPS constellation for the joint program office.

(Current as of January 1990)